

REMARKS

Claims 12-17 are pending in this application. Claims 12 and 16 have been amended. New dependent claim 17 has been added. No new matter has been introduced.

Independent claim 12 has been amended to recite that the fuel is an equilibrium mixture formed by 50 to 95% conversion of methanol containing up to 20% w/w water. Support for this limitation is in the original description on page 24, lines 14, 28 and 29 and also on page 21, lines 11 to 14, in combination with Figure 1.

Dependent claim 16 has been amended to recite ranges of the claimed concentrations, as used in the description.

New dependent claim 17 has been added to recite the ethanol content (recited in previously-presented claim 12, which is currently amended and which has the ethanol content limitation canceled). Support for newly-added claim 17 is found on page 25, lines 2 to 3 and page 7, lines 3 to 4 of the application.

Applicants address below the rejections of claims 12-16, in the order presented in the May 31, 2007 Office Action:

Claims 12-16 Comply With 35 U.S.C. § 112, First Paragraph

Claims 12-16 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. This rejection is respectfully traversed.

Applicants disagree with the Examiner's assertion that the original application does not support the limitation "the concentration of dimethyl ether is between 30 and

68% w/w," or "30 and 60% w/w" and "the concentration of water is between about 14 and 40% w/w," as recited in claims 12-16. (May 31, 2007 Office Action at 2). Applicants further respectfully disagree with the Examiner's assertion that, although "Applicant provides examples to explain how the disputed limitations were reached," "Applicant's examples are just that, examples" which are "not set forth in the specification and do not provide support for the claimed limitations." (May 31, 2007 Office Action at 2).

According to Federal Circuit case law, "the disclosure need only reasonably convey to persons skilled in the art that the inventor had possession of the subject matter in question." See Fujikawa v. Wattanasin, 93 F.3d 1559, 1570 (Fed. Cir. 1996); See also In re Alton, 76 F.3d 1168, 1175 (Fed. Cir. 1996) ("If a person of ordinary skill in the art would have understood the inventor to have been in possession of the claimed invention at the time of filing, even if every nuance of the claim is not explicitly described in the specification, then the adequate written description requirement is met."); Monsanto Co. v. Mycogen Plant Science, Inc., 61 F. Supp. 2d 133, 188 (D. Del. 1999) ("The applicant need not describe the subject matter claimed in exact terms."); See also Ralston Purina Co. v. Far-Mar-Co., 772 F.2d 1570, 1575 (Fed. Cir. 1985); Plastic Container Corp. v. Continental Plastics of Oklahoma, Inc., 607 F.2d 885, 886 (10th Cir. 1979). In fact, the law "does not require . . . an example to satisfy the written description requirement." Flehmig v. Giesa, 13 USPQ2d 1052 (Bd. Pat. App. & Int'f. 1989).

In the present case, the specification reasonably conveys to one skilled in the art that Applicants had possession at the time of filing of the subject matter of claims 12-16. Claims 12-16 relate to an equilibrium mixture of dimethyl ether, methanol and water, as disclosed on page 1, lines 7 to 10 of the specification. The preferred fuel is converted from methanol containing from 0 to 20% by weight of water, which results in mixtures

represented by the area on and between the two lines A and B in Figure 1. Preferably, the fuel is obtained by 50 to 95% conversion of the methanol in the feed, as outlined on page 24, line 14 of the specification.

The four combinations of the above mixtures are consequently: a) a 50% conversion of pure methanol; b) a 95% conversion of pure methanol; c) a 50% conversion of methanol with 20 wt% water; or d) a 95% conversion of methanol with 20% water.

To calculate the composition of a resulting mixture from converting 50% of methanol by dehydration is well known to a person skilled in the art, for example, a chemical engineer, a chemical scientist or a chemical test engineer, based on his/her common knowledge. Contrary to the Examiner's assumption, the calculation does not represent an undue burden.

Further, the resulting mixtures of the above four alternatives are expressed as DME/methanol/water concentration by weight, as follows:

- a) 36/50/14;
- b) 68/5/27;
- c) 29/40/31; and
- d) 55/4/41, respectively.

Thus, an equilibrium mixture with from 29 to 68% of DME is supported by the description of the application.

Moreover, to define the fuel by its dimethyl ether content allows for an easy comparison to the fuel as disclosed in Basu et al. and, thus, it is not an undue burden to a person skilled in the art.

As to the fuel of the claimed invention being an equilibrium mixture and having, for example, 55 wt% of dimethyl ether, Applicants submit that a fuel containing 55 wt% dimethyl ether cannot, at the same time, contain any amount in the range of 4 to 50 wt% of methanol. The amounts of methanol must be the amounts as illustrated in Figure 1, on and between the lines A and B and being valid for 55 wt% dimethyl ether. Amended claim 12 reflects the above-noted limitations.

In view of the above, Applicants respectfully submit that the specification enables a person skilled in the art to carry out the invention recited in the claim, and the original application supports all limitations of amended independent claim 12. Accordingly, withdrawal of the rejection of claims 12-16 under 35 U.S.C. § 112 is respectfully requested.

Claims 12-16 Are Patentable Over The Cited Prior Art References

Claims 12-16 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Basu et al. (U.S. Patent No. 6,270,541) ("Basu") in view of Applicants' admitted prior art (APA), Ford Vehicles, Mendler (U.S. Patent No. 6,1125,801) and Ceynow (U.S. Patent No. 5,440,880). This rejection is respectfully traversed.

The subject matter of claims 12-16 would not have been obvious over Basu, APA, Ford Vehicles, Mendler and Ceynow, considered alone or in combination. The cited

references, alone or in combination, do not disclose, teach or suggest all limitations of amended independent claim 12.

Basu discloses fuels with from 70 to 95 wt% dimethyl ether, methanol and water. Applicants submit that the fuel formed by dehydrating methanol and having 70 wt% dimethyl ether has approximately 27 to 30 wt% water, and not "containing from 0 and up to 20% w/w water," as in the claimed invention.

In claim 1 and column 3, lines 49 and 50, Basu discloses fuels with from 1 to 20 wt% water. However, even if *arguendo* Basu would disclose a fuel containing only 68 wt% of dimethyl ether, that fuel would still have to contain 27 wt% of water if it was an equilibrium mixture (as the fuel of the present invention). However, a content of 27 wt% of water does not make sense in the formula in claim 1 of Basu. Thus, Basu and the present invention disclose totally different fuel compositions.

Basu further teaches fuels with from 70 to 95 wt% of dimethyl ether and also discloses a preferred range of from 85 to 93 wt% of dimethyl ether. A person of ordinary skill in the art would conclude from the disclosed preferred range that fuel falling within the preferred range up to 93 wt% of dimethyl ether has improved properties as compared to a fuel only falling within the broader range. However, as the lower limit of DME of the preferred range shifts from 70 wt% to 85 wt%, a person skilled in the art would not expect a fuel only having a concentration of dimethyl ether of 68 wt% to have the same or better properties as a fuel having a concentration of 70% DME. To the contrary, a person skilled in the art would contemplate a content higher than 70 wt% of dimethyl ether as being the fuel having the better properties, as the preferred lower limit is 85 wt% and, thus, much higher than 68wt%.

Finally, Basu discloses the recycling of exhaust gas and the cooling of the combustion air. Basu does not disclose or even suggest, however, heating the combustion air.

The additional prior art references (Ford Vehicles, Mendler and Ceynow) do not rectify the deficiencies of Basu. Ford Vehicles defines EGR as recycling of parts of the exhaust gas to reduce harmful nitrogen oxide emission. Again, a person of ordinary skill in the art cannot derive from the disclosure of Ford Vehicles to heat the combustion air.

The engine disclosed in Mendler is not a diesel engine and, consequently, the fuel is different from the fuel used for a diesel engine. As is clearly common knowledge to every car owner, diesel fuel should not be filled into a tank of a car with a gasoline engine. As Mendler does not disclose or suggest improvements for a diesel engine, the engine of Mendler is completely different from that of the present invention.

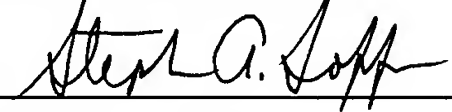
Ceynow discloses the cooling of combustion of air (reference 16 in Figure 1) upstream of introducing air into the engine (reference 15 in Figure 1). Ceynow suggests using a temperature of maximum 50°C under normal operating conditions (column 4, line 6). Ceynow does not disclose, teach or suggest, however, a temperature of 60°C or higher, preferably above 100°C, as in the claimed invention.

In summary, all cited references relate to the cooling of combustion air, and none of the references discloses or even suggests a fuel similar to the fuel employed in the method of the present invention. It is further not obvious from the prior art to preheat combustion air to improve engine performance.

In view of the above remarks, allowance of all pending claims 12-17 is solicited.

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